SHORING

ENABLING OBJECTIVES

IDENTIFY the need for basic shoring structures and the materials used for their construction in accordance with NSTM 079 VOL 2, NWP 3-20.31, COMNAVSUFLANTINST 3541.1 and COMNAVSURPACINST 3541.4

IDENTIFY proper procedure, tools and equipment to construct shoring in accordance with NSTM 079 VOL 2, NWP 3-20.31, COMNAVSUFLANTINST 3541.1 and COMNAVSURPACINST 3541.4

ENABLING OBJECTIVES

LAYOUT and Construct I, H, and K Type Shoring structures given Shoring and a Shoring Kit in accordance with NSTM 079 VOL 2, NWP 3-20.31, COMNAVSUFLANTINST 3541.1 and COMNAVSURPACINST 3541.4

SHORING

Process of placing supports against, beneath or above damaged areas

- **Prevents additional sagging, bulging or metal fatigue**
- **Temporary structure**

SHORING

When to Shore

Good judgement is the best guide

Need indicated by:

- Loose soil, cracks and
- Previous cave-ins
- Surcharge loads

TYPES OF SHORING

Direct Compression **(I Type)**

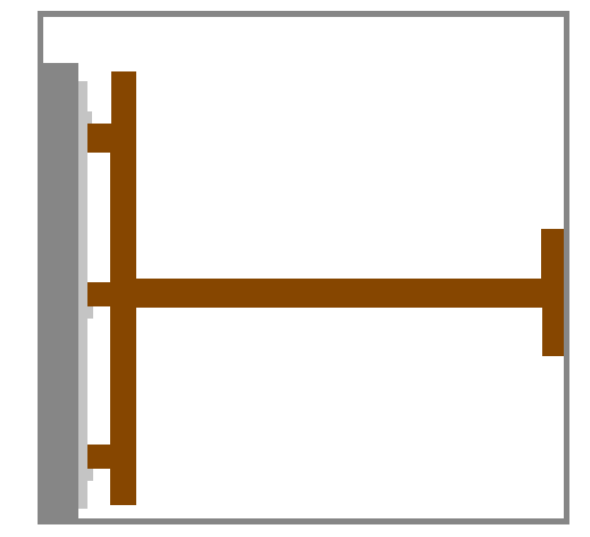
Pressure acting parallel to axis

Simplest and strongest shoring structure

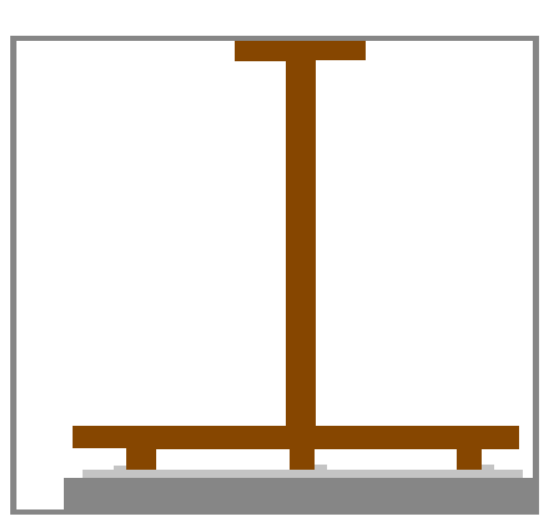
Vertical or Horizontal

TYPES OF SHORING

Direct Compression



(I Type)



TYPES OF SHORING

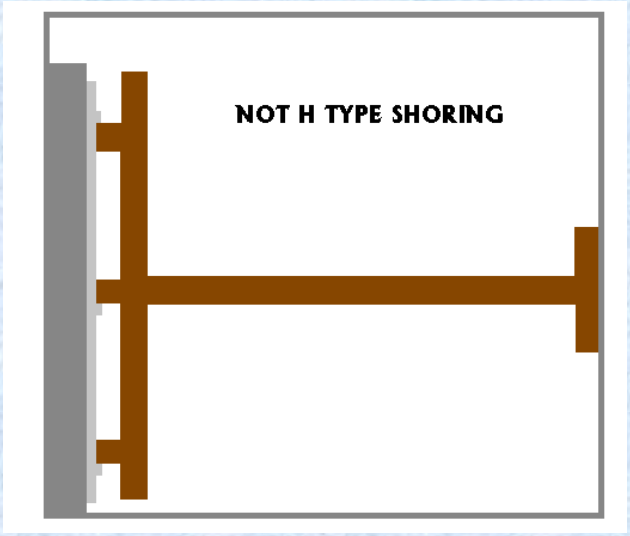
Cross-Axial **(H-Type)**

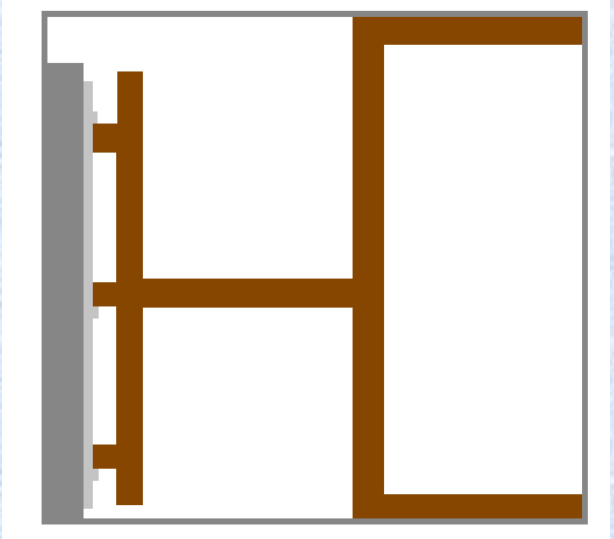
Pressure acting perpendicular to axis

H-Type Shore will support only moderate pressure

TYPES OF SHORING

Cross-Axial (H Type)





TYPES OF SHORING

Triangulation **(K-Type)**

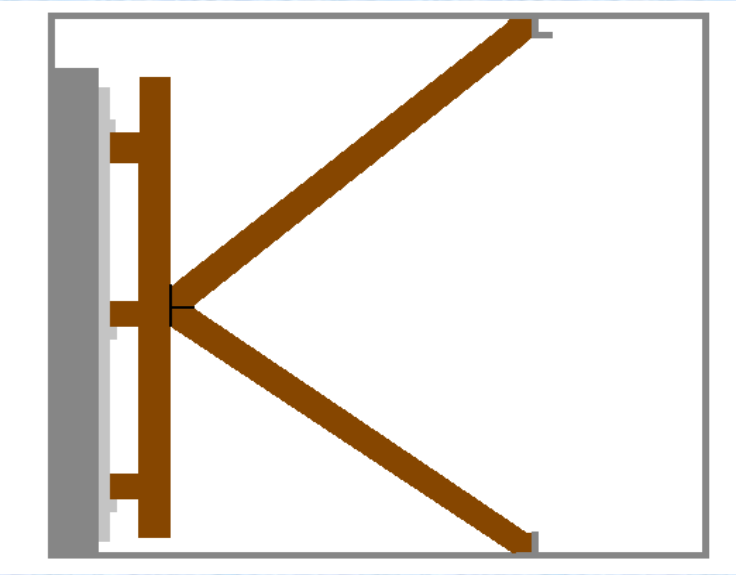
Both shores under direct compression

Ends cut a 90° angles

Installed at not more than 90° angle

TYPES OF SHORING

Triangulation (K Type)



SHORES

Types

- Wood Shores
- Steel Shores

SHORES

Wood Shores

- Portable Beam
- Made of Soft Woods

- **DOUGLAS FIR**
- **YELLOW PINE**
- **HEMLOCK**
- **SPRUCE**

SHORES

Wood Shores

Treatment

Fire Resisting Chemicals

Fire Retardant Paint

SHORES

Wood Shores

Stowage

In lengths 16’ to 18’ long. Distributed throughout the ship in accessible areas above the waterline

SHORES

Wood Shores

Working length (Max)

30 times the minimum thickness of shore

SHORES

Steel Shore

- Adjustable and Telescoping
- Available in two sizes

3 F00T to Maximum of 5 FOOT (Model 3-5)

20,000 pounds support when closed

12,000 pounds support when fully extended

6 F00T to Maximum of 11 FOOT (Model (6-11)

20,000 pounds support when closed

6,000 pounds support when fully extended

SHORES

Steel Shore

Advantages

- **Fire Proof**
- **Stronger than wood**
- **Minimum stowage space required**
- **Minimum time lost while constructing**
- **Will not slip or slide when welded**
- **Tighter than wood**
- **No wedges required when welded**

SHORES

Steel Shore

Disadvantage

During welding of steel shores, heat and sparks are produced

WEDGES

Types

- Wood
- Steel

WEDGES

Wood Wedges

Made of Soft Wood

- **DOUGLAS FIR**
- **YELLOW PINE**

WEDGES

Wood Wedges

- Tighten and hold shore in place
- Rough cut and unpainted
- Triangular side block
- Rectangular butt
- Width same as the shore being used

WEDGES

Wood Wedges

- Length of wedge
  - Six times the Butt Thickness

WEDGES

Wood Wedges

Installation

- Always Used in Pairs
- Width to Width of Shore
- Rough Side to Rough Side
- Driven in Simultaneously

WEDGES

Steel Wedge

Primarily used for prying

SHOLES

A shole is a flat plate which may be placed under the end of a shore to distribute weight or pressure

SHOLES

Types

Softwood

Douglas Fir or Yellow Pine

Thickness of at least 1 inch and a minimum of 8 inches wide

SHOLES

Types

- **Steel Plate**
  - May be used with steel shores
  - Do not prefabricate

STRONGBACK

A bar or beam of wood or metal, often shorter than a shore, use to distribute weight or pressure, or serves as an anchor for a patch over a hole

TOOLS

Hand and Powered

- Hand Lantern
- Tapes and Folding Rules
- Carpenter’s Square
- Measuring Batten
- Saws, Mauls, Hammers, Sledges
- Cutting Outfit
- Welding Machine

MEASURE SHORING

Measuring (Shoring) Batten

- **Easiest and Quickest**
- **Adjustable**
- **90 Degree angle at both ends**
- **Take Diagonal Measruements**
- **May lose Accuracy**

MEASURE SHORING

Carpenter’s Square

- **Used for all measurements**
- **Use requires training**

(When not utilizing the Shoring Batten)

MEASURE SHORING

Carpenter’s Square

Parts of the Carpenter’s Square

- Tongue
- Heel
- Body

MEASURE SHORING

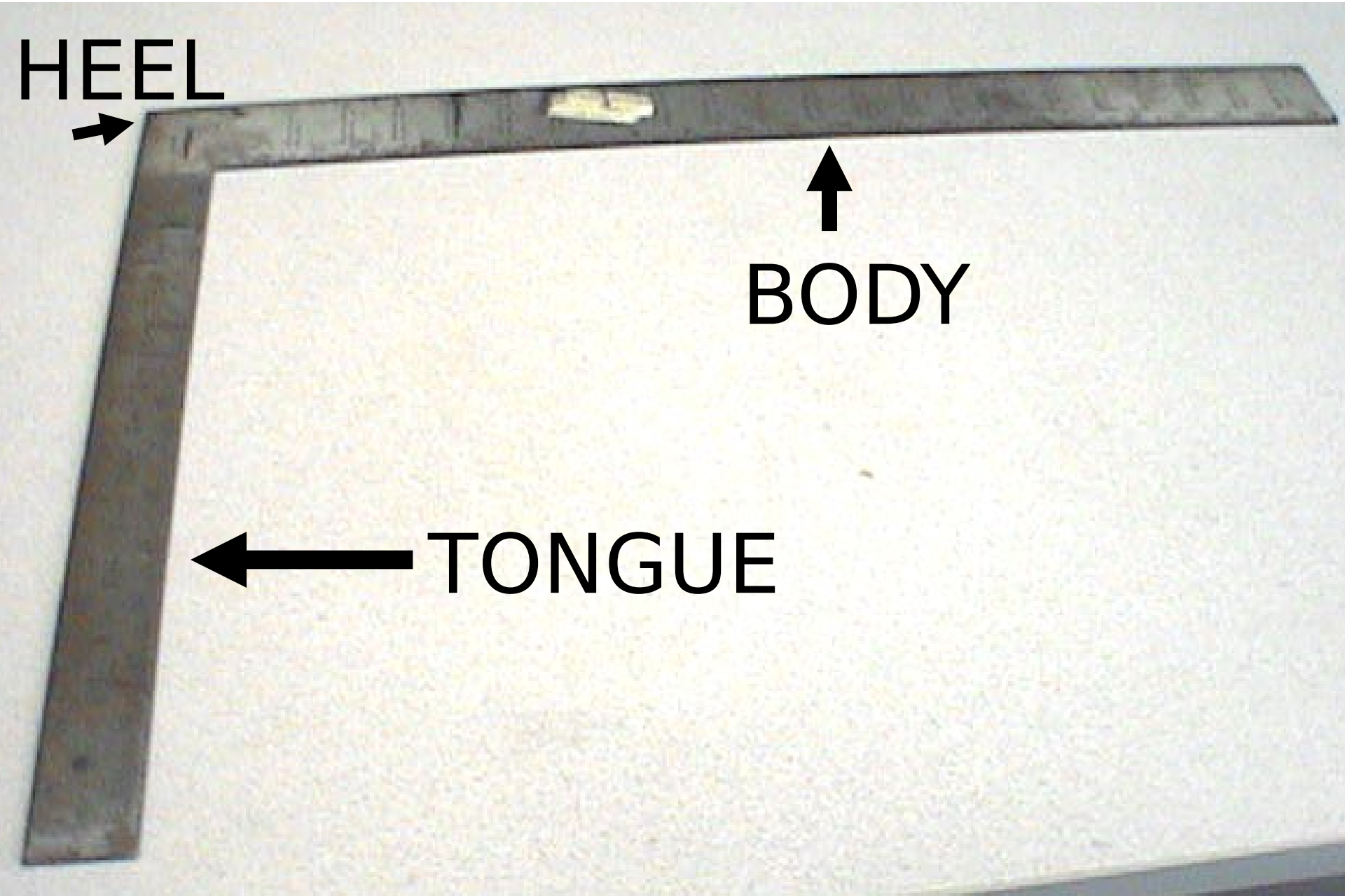
Carpenter's Square

Parts of the Carpenter's Square

The Carpenter's Square is divided in 1/12 and 1/16 of an inch.

Always use the side that is divided into 1/12 of an inch

Carpenters square

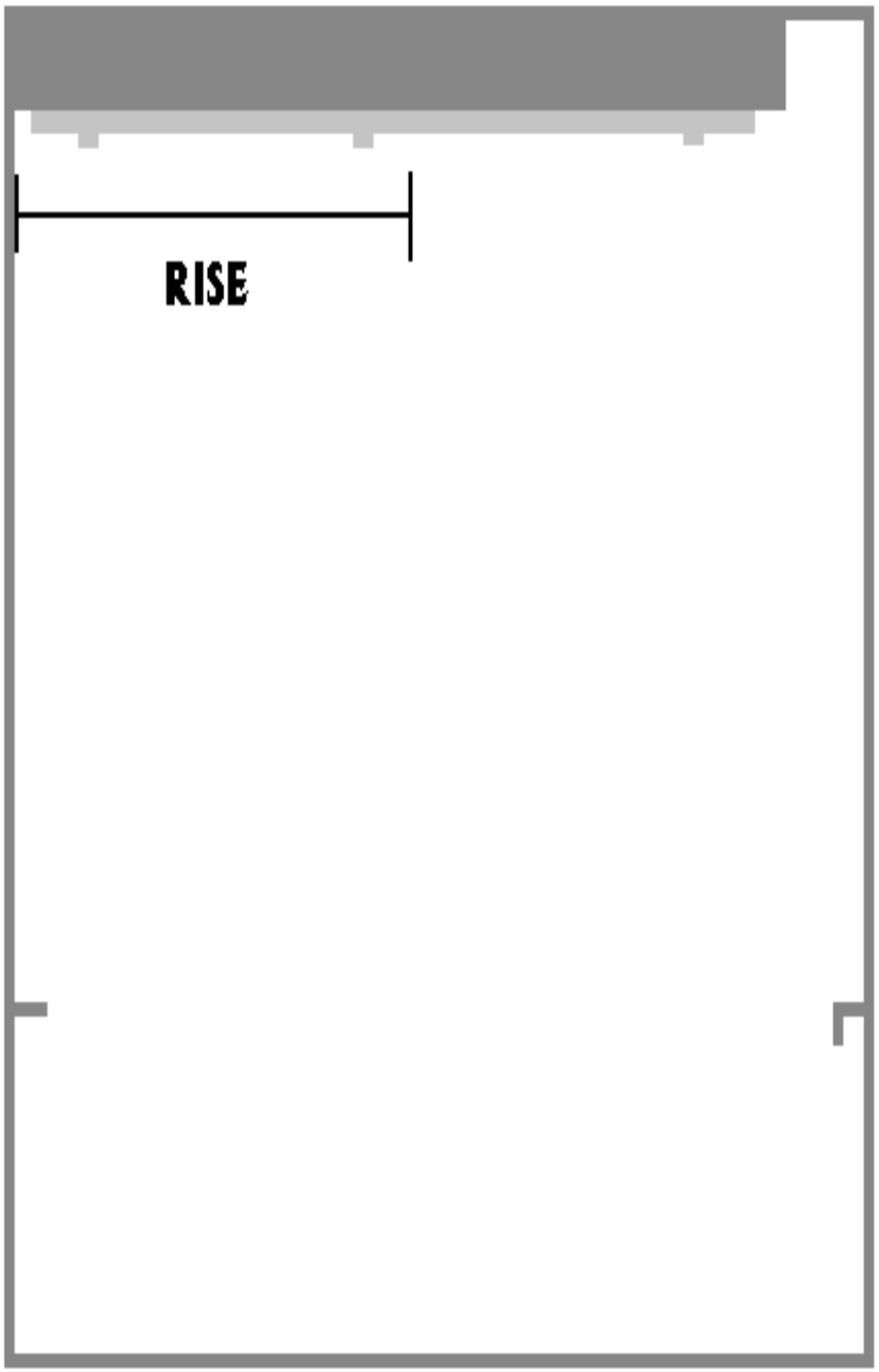


ALWAYS HOLD THE TONGUE OF THE CARPENTER'S SQUARE IN THE LEFT HAND

MEASURE SHORING

Measurements (3 needed)

RISE: **Measurement from the deck or overhead to the center of damage.**

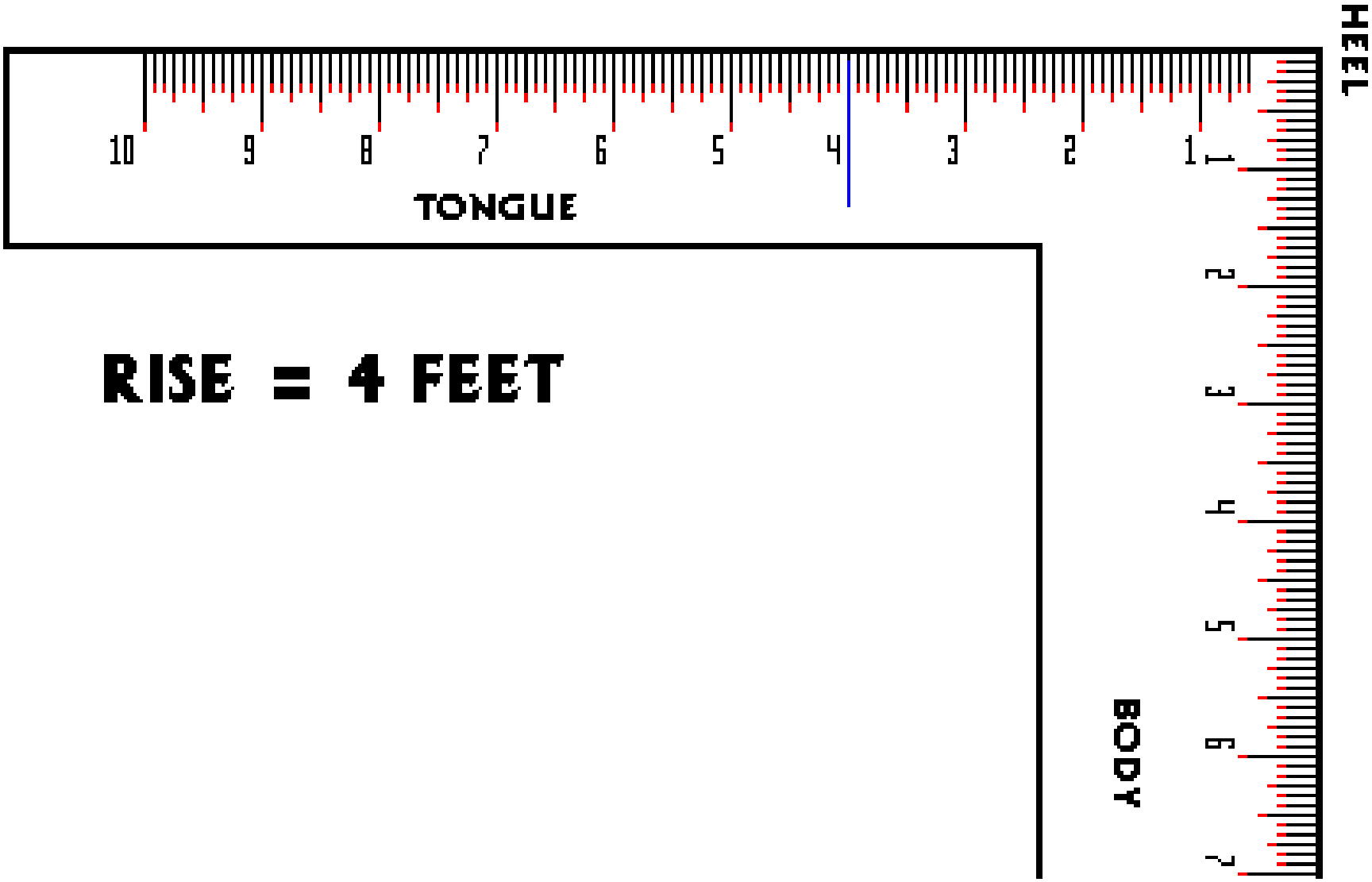

RISE

MEASURE SHORING

Measurements (3 needed)

RISE: Measurement from the deck or overhead to the center of damage.

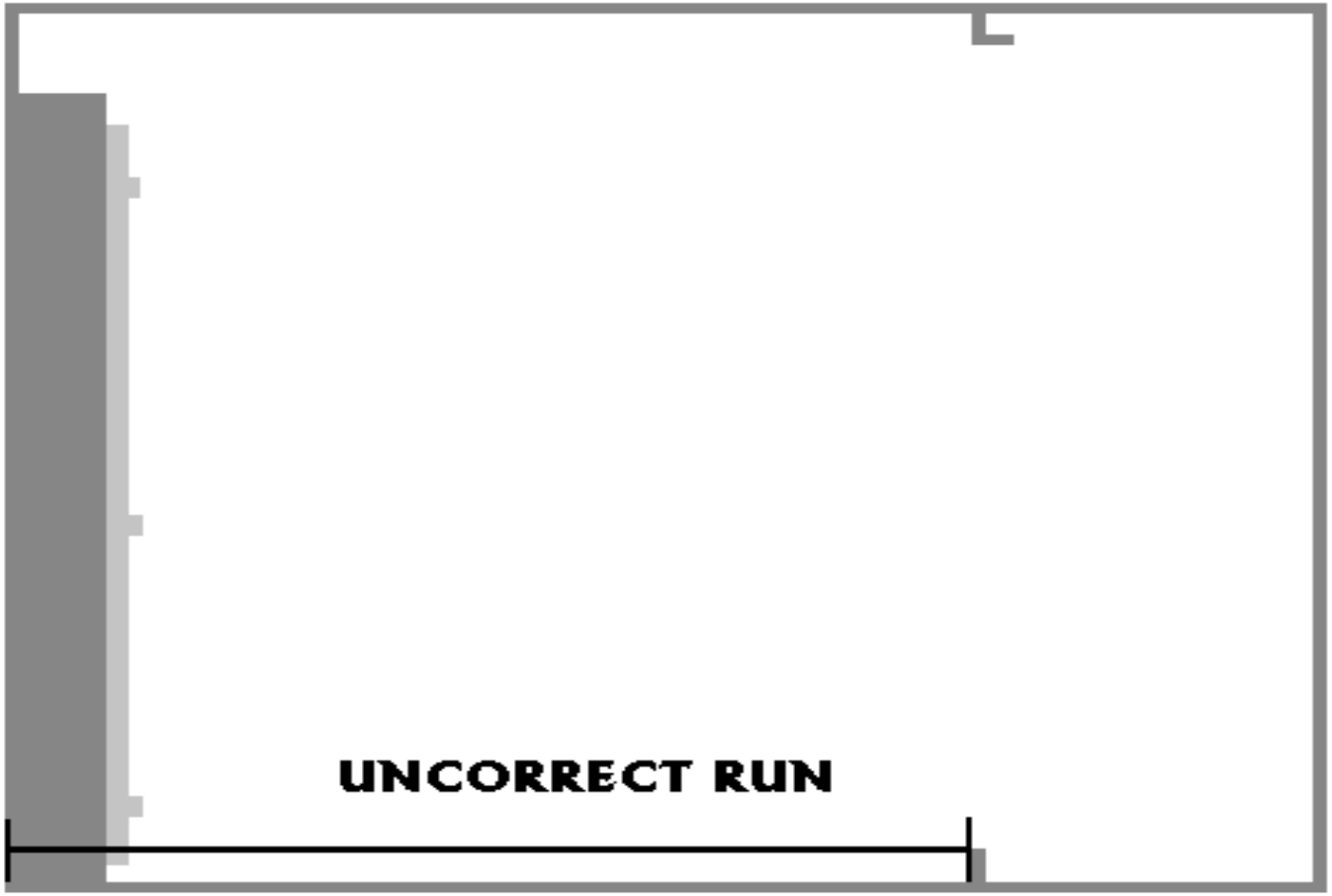
Reading goes on the Tongue


10
9
8
7
6
5
4
3
2
1
TONGUE
HEEL
1
2
3
4
5
6
7
BODY
RISE = 4 FEET

MEASURE SHORING

Measurements (3 needed)

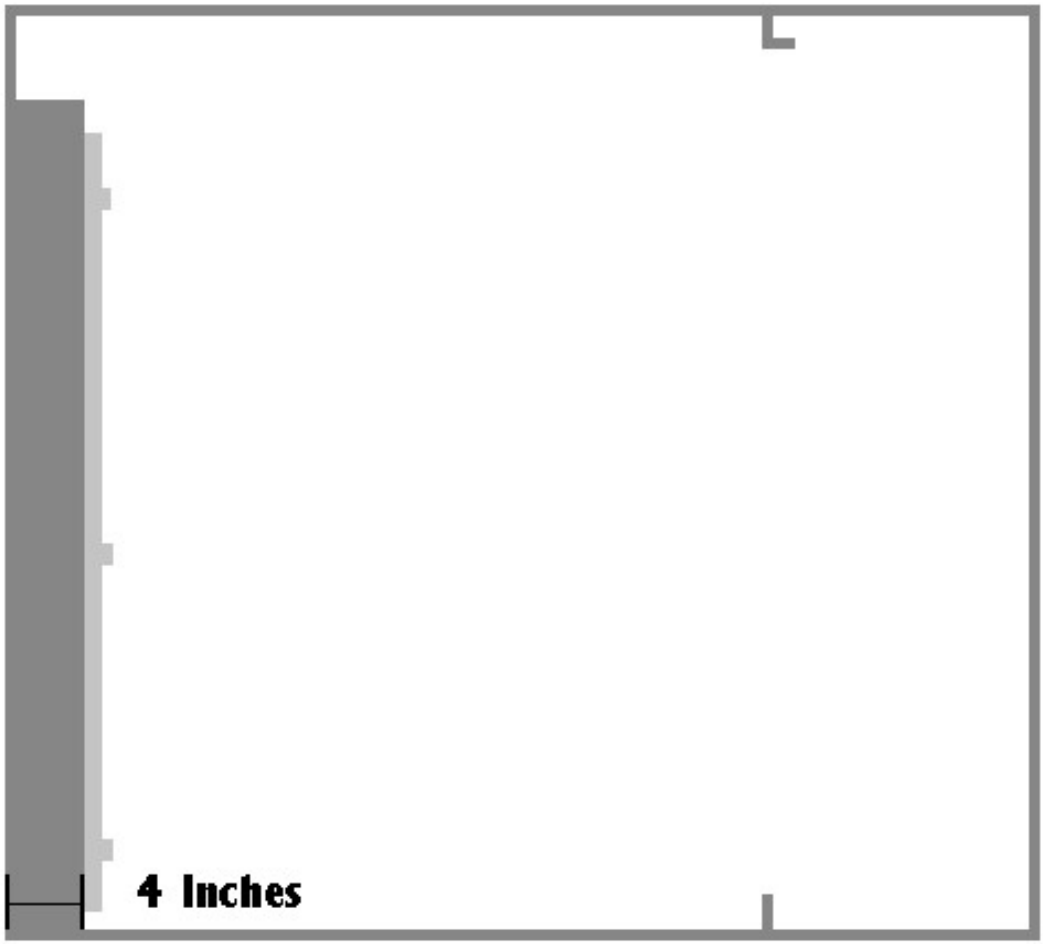
UNCORRECTED RUN: **Measurement from the bulkhead to the anchor point**

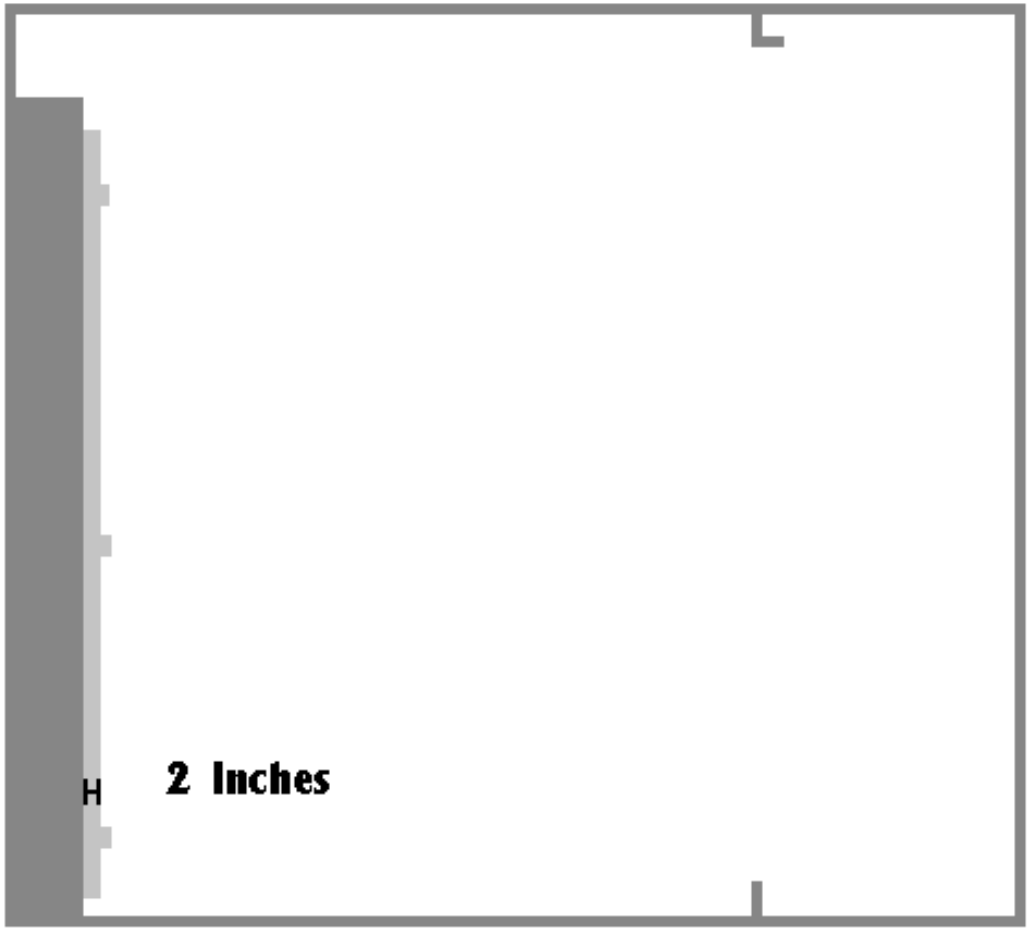

UNCORRECT RUN

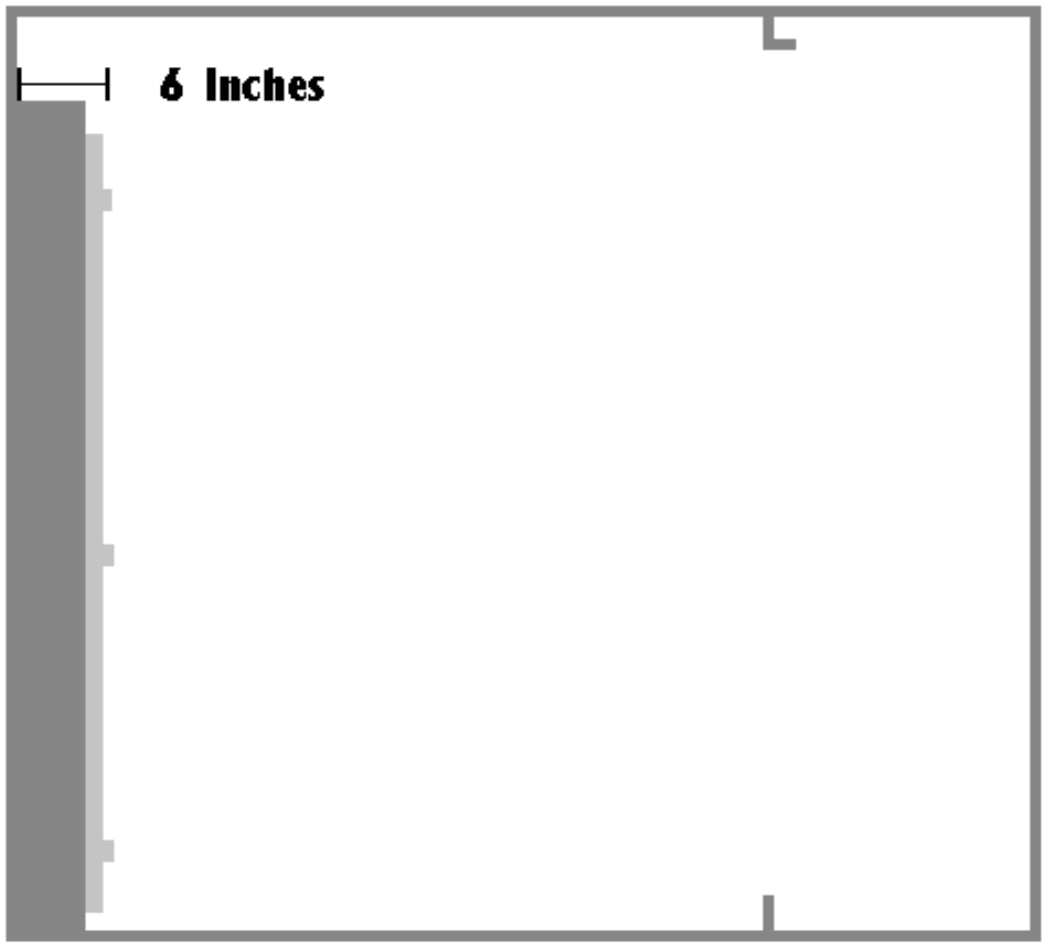
MEASURE SHORING

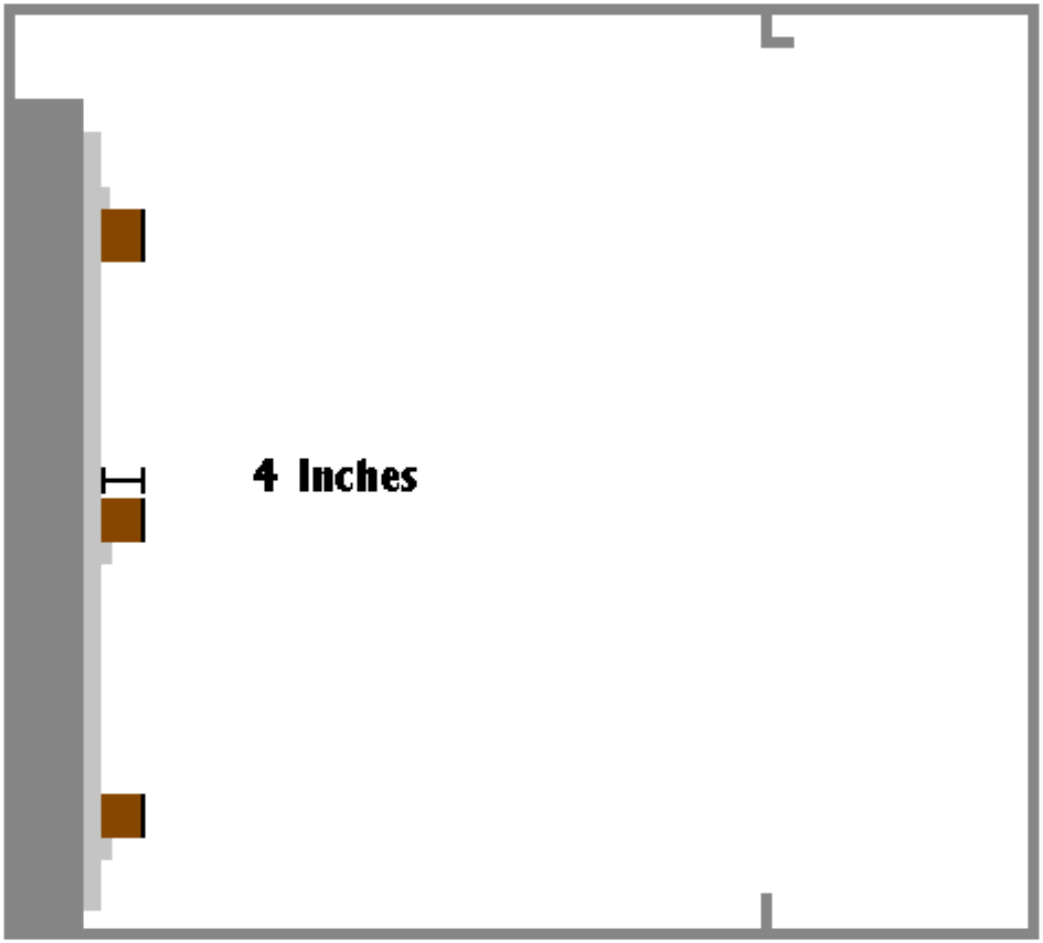
Measurements (3 needed)

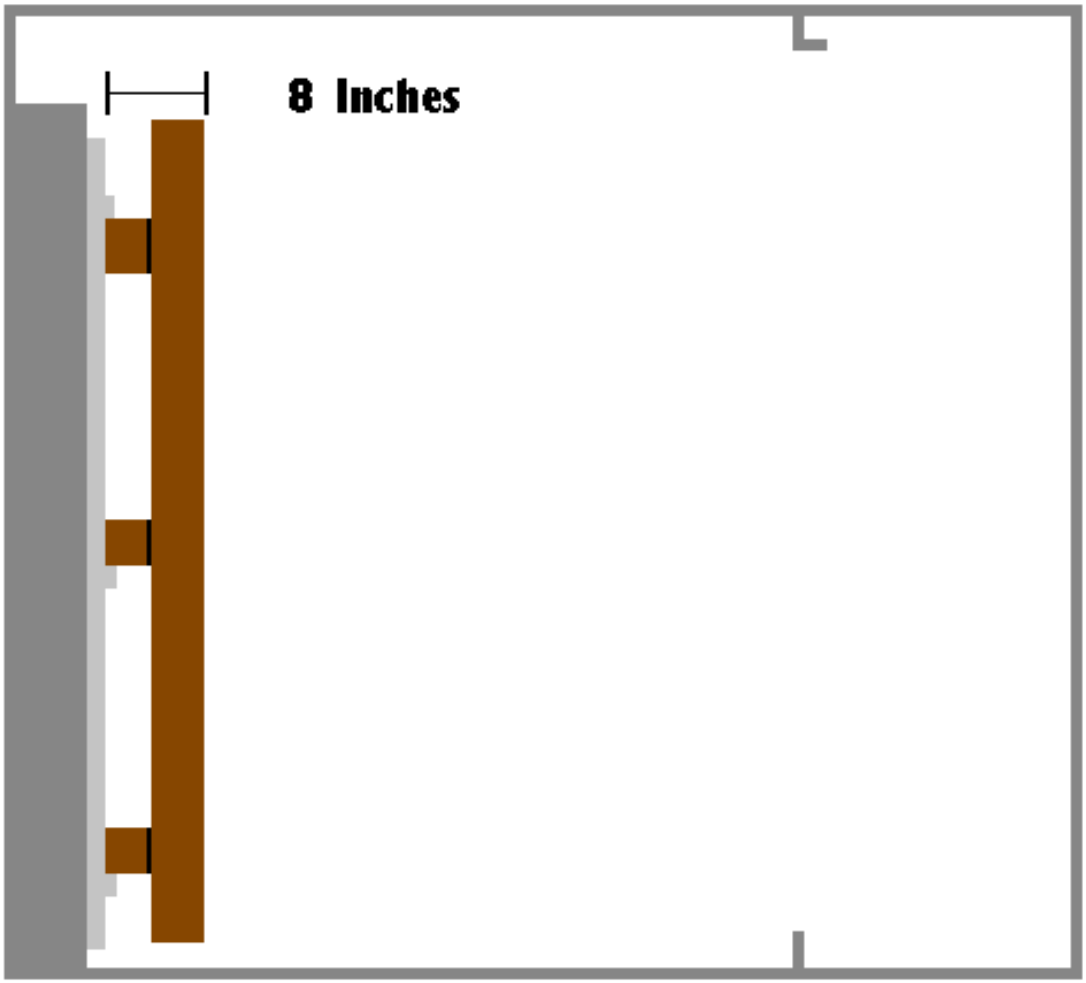
CORRECTED RUN: **Measurement from the bulkhead to the anchor point compensating for thickness of (strongbacks, wedges, etc.)**

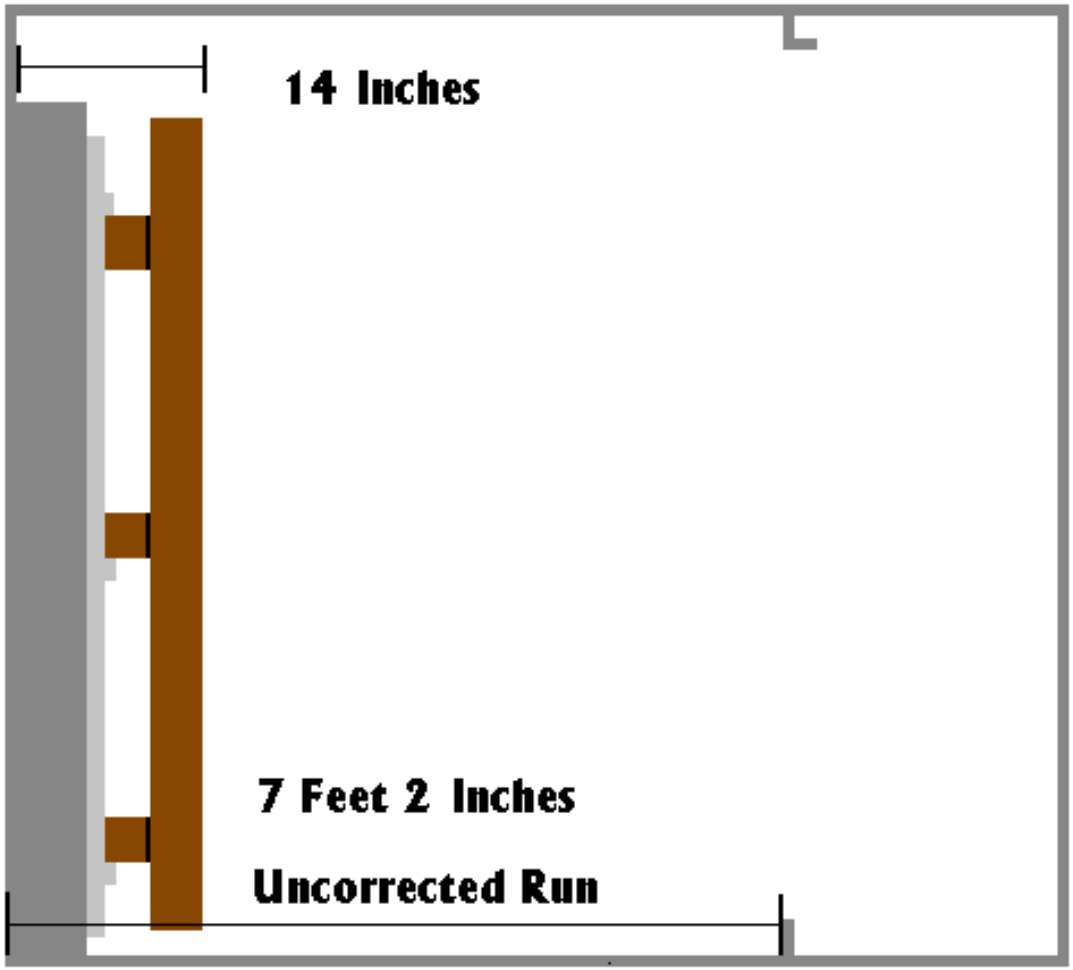

4 Inches


H
2 Inches


6 Inches


4 Inches


8 Inches


14 Inches
7 Feet 2 Inches
Uncorrected Run

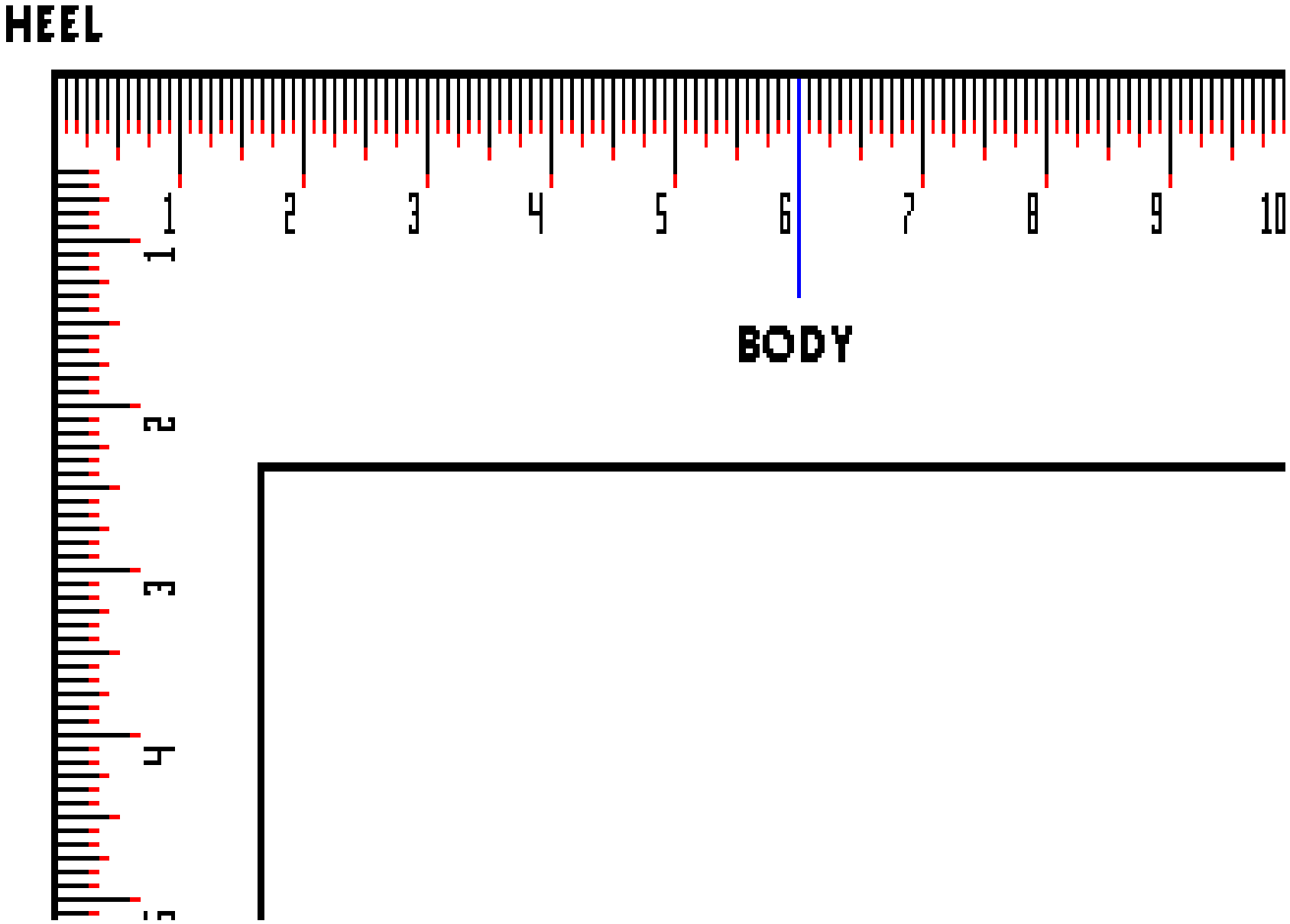
14 Inches
6 Feet
Corrected Run

MEASURE SHORING

Measurements (3 needed)

CORRECTED RUN Measurement from the bulkhead to the anchor point compensating for thickness of (strongbacks, wedges, etc.)

Reading goes on the Body

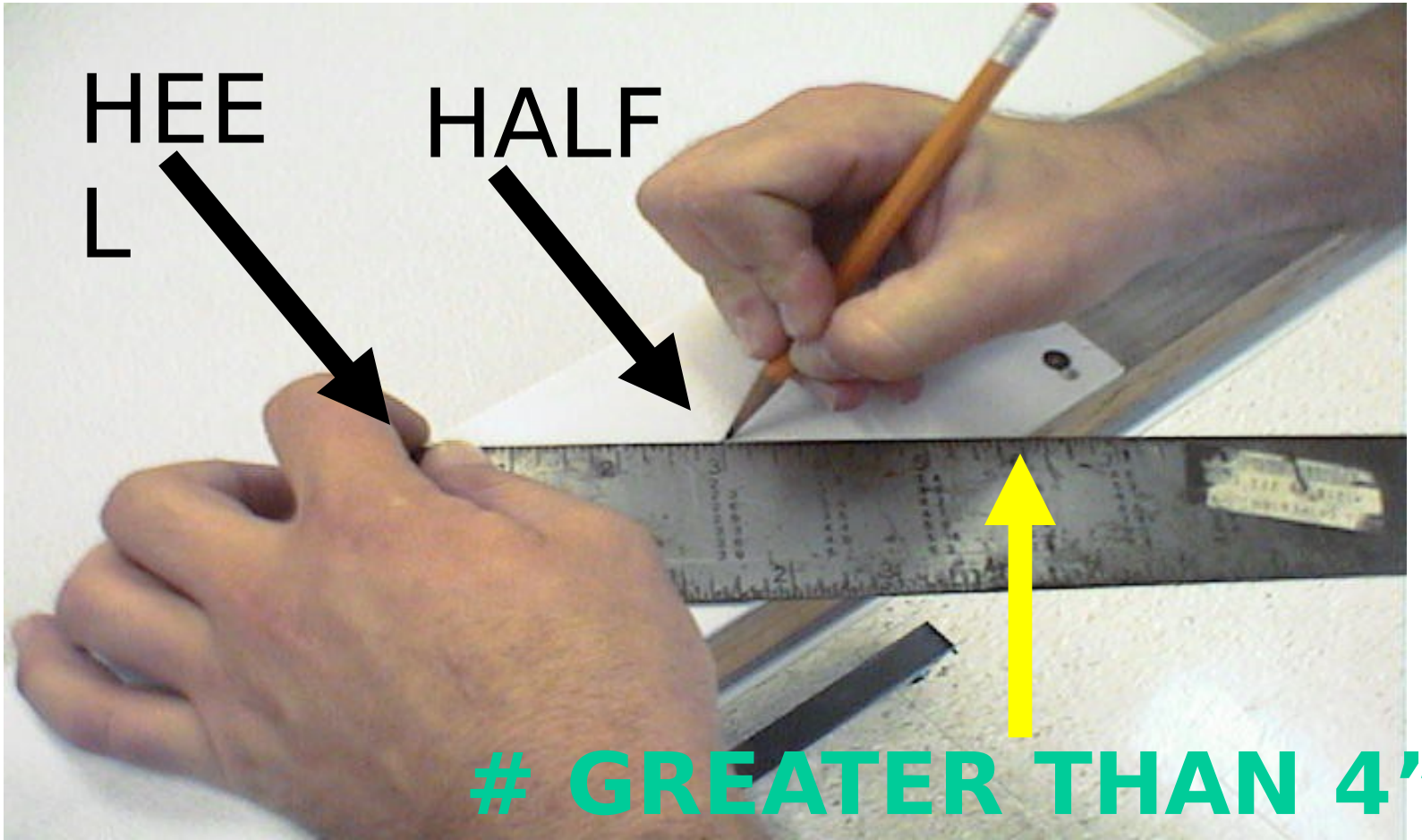

HEEL
1
2
3
4
5
6
7
8
9
10
BODY
1
2
3
4

Layout of the Shore:

Find the center of the shore using the Carpenter’s Square

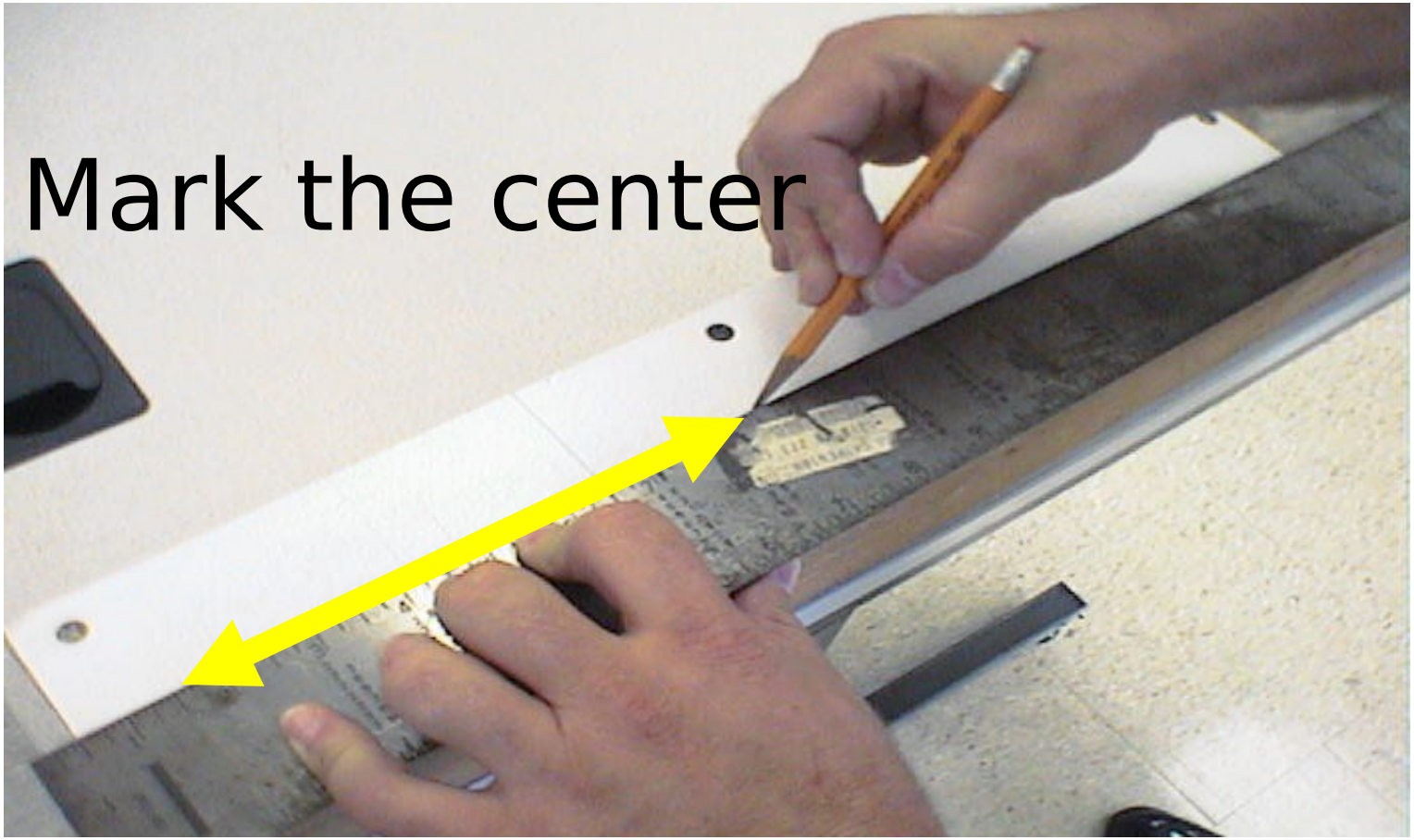
Layout of K type shoring

❷Find the center line



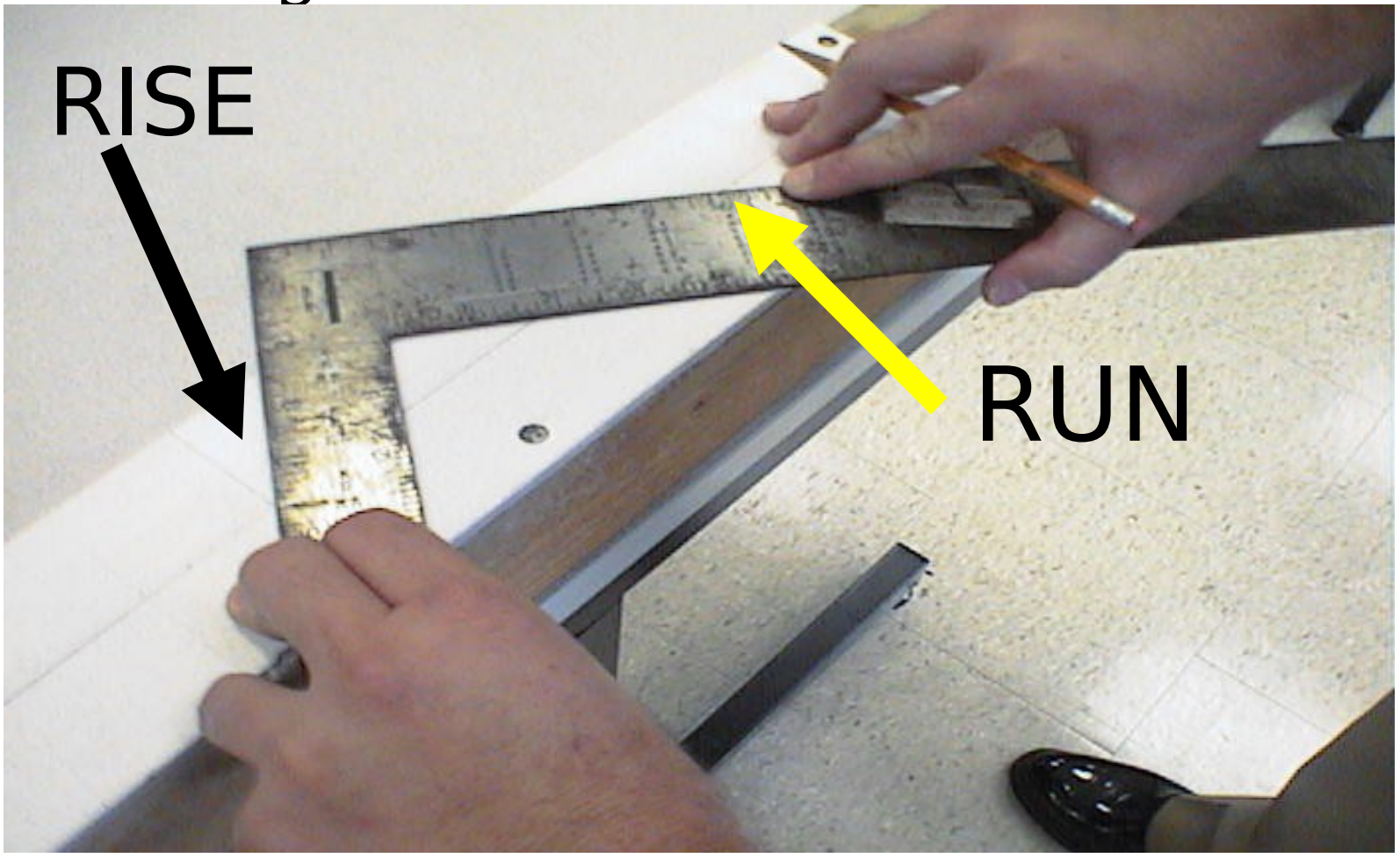
Layout of K type shoring

- Center line



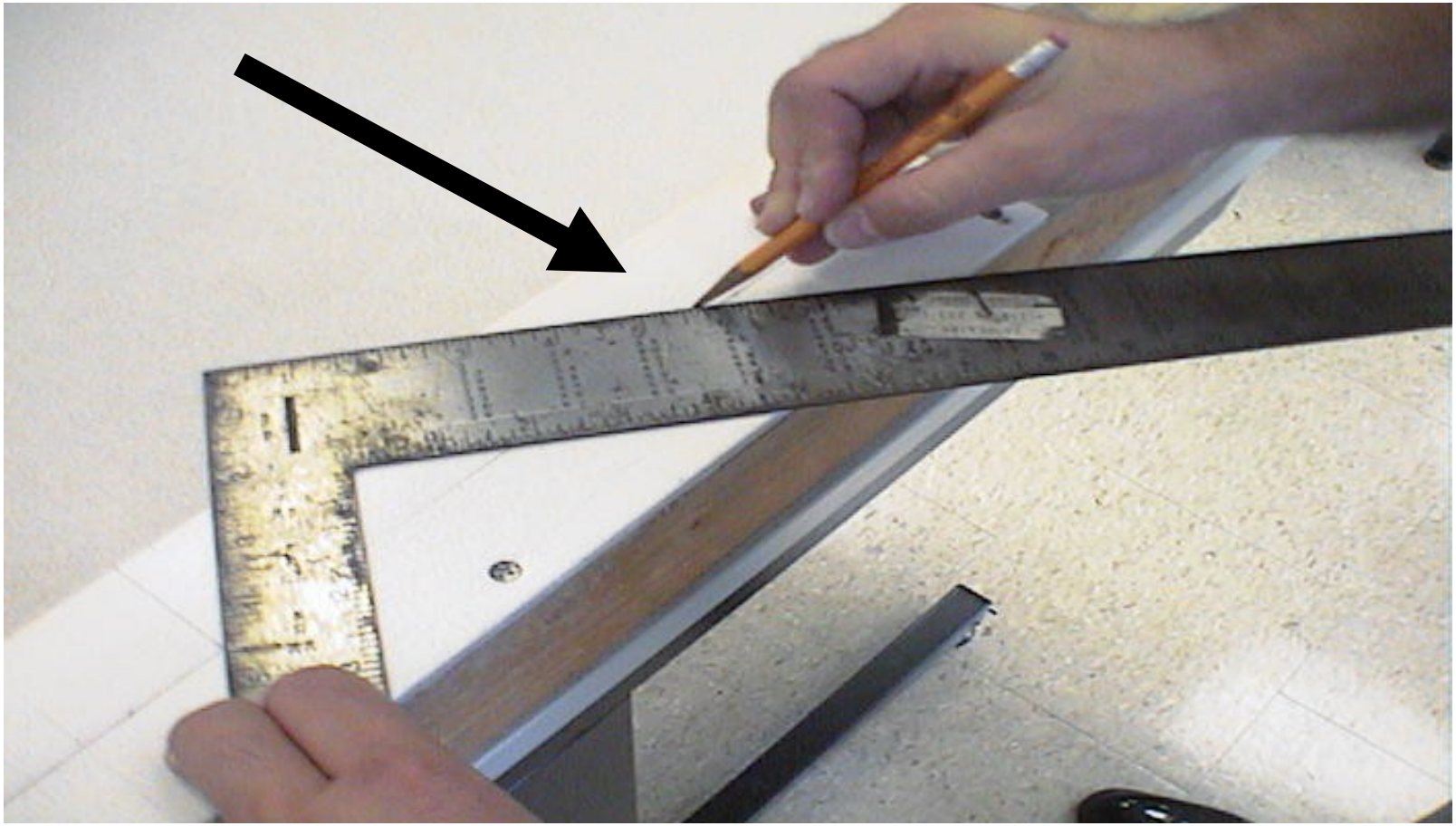
Layout of K type shoring

- Marking the Rise & Run



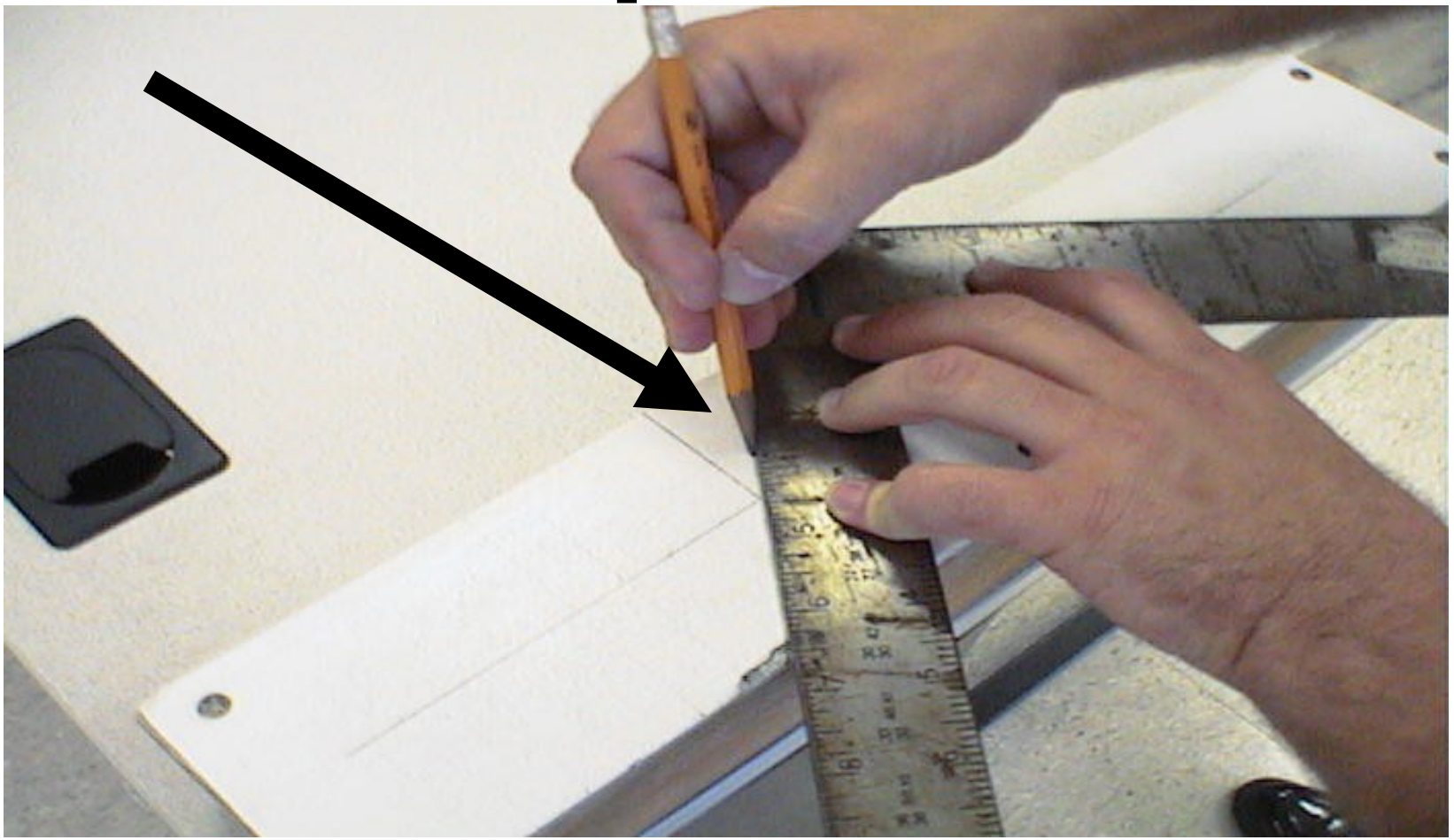
Layout of K type shoring

- Marking the shore for the length



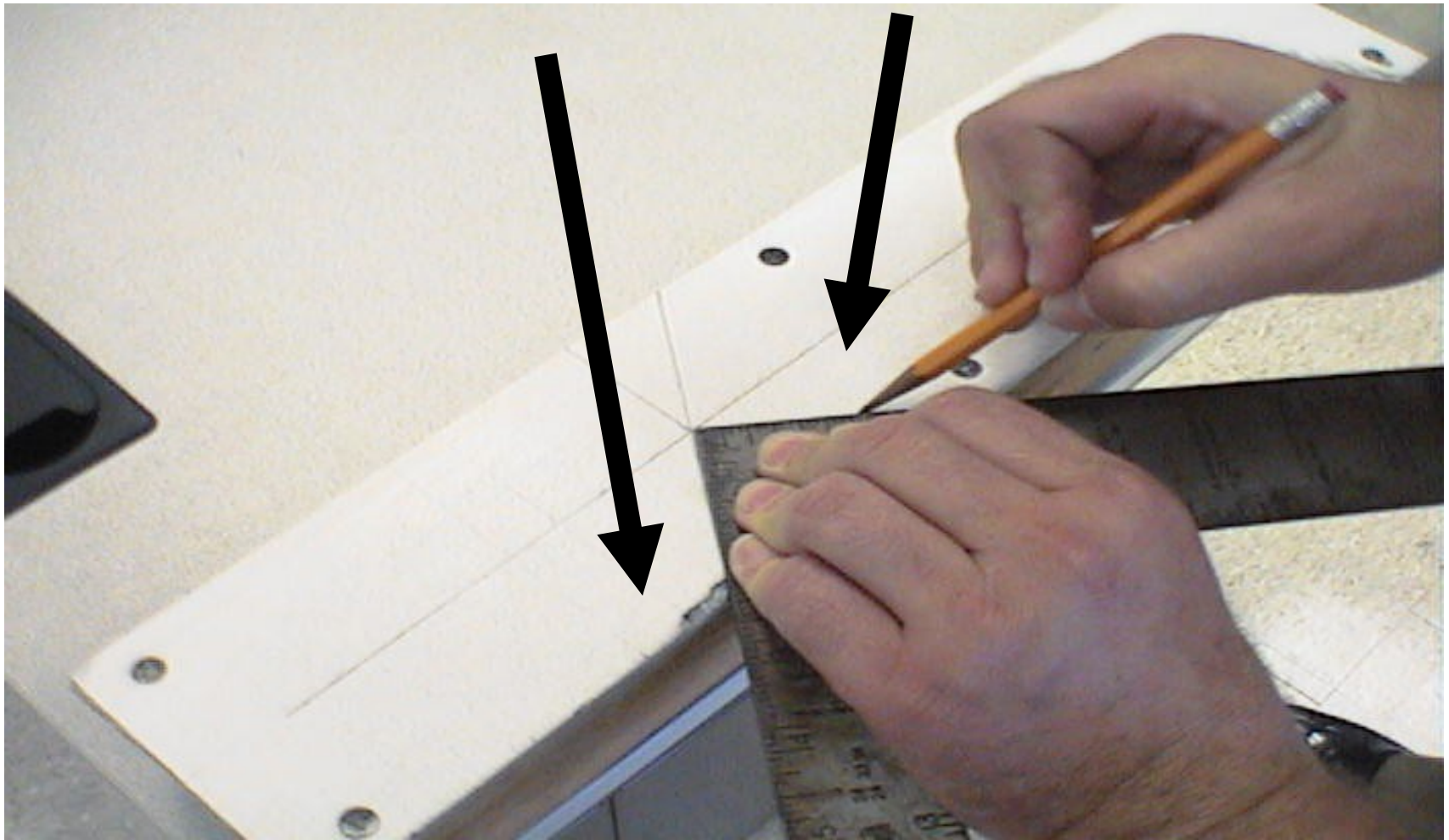
Layout of K type shoring

- Mark front of square



Layout of K type shoring

- Slide square down & mark outside

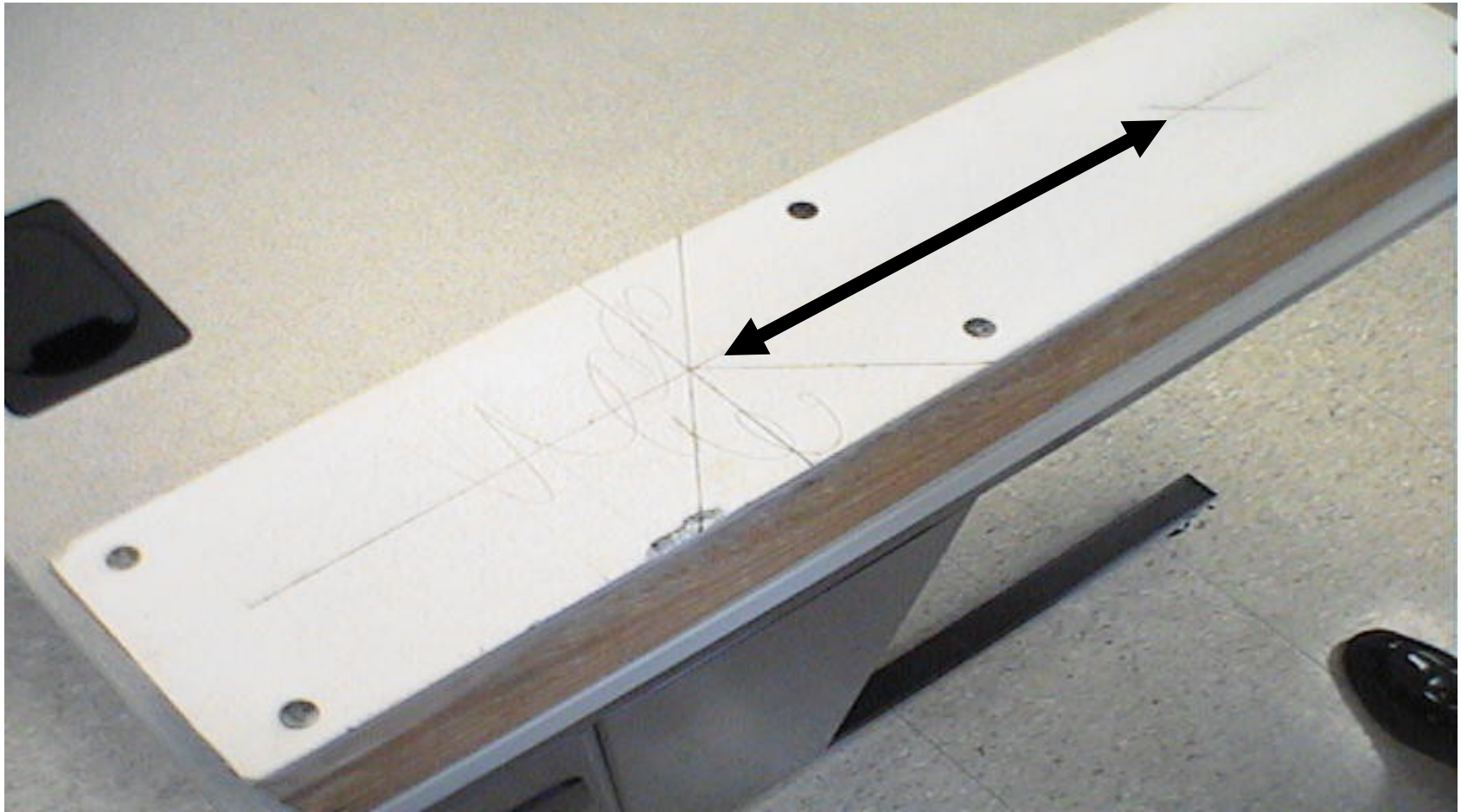


Layout of K type shoring

- Finished product

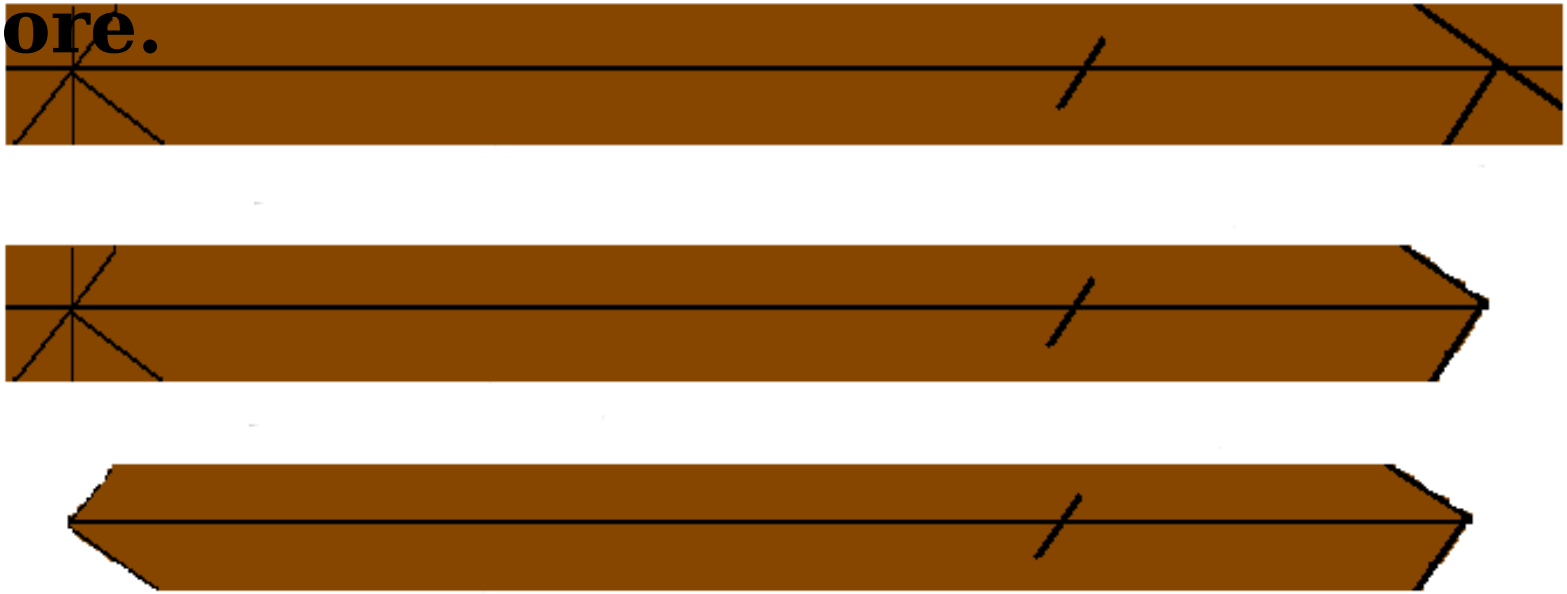
Layout of K type shoring

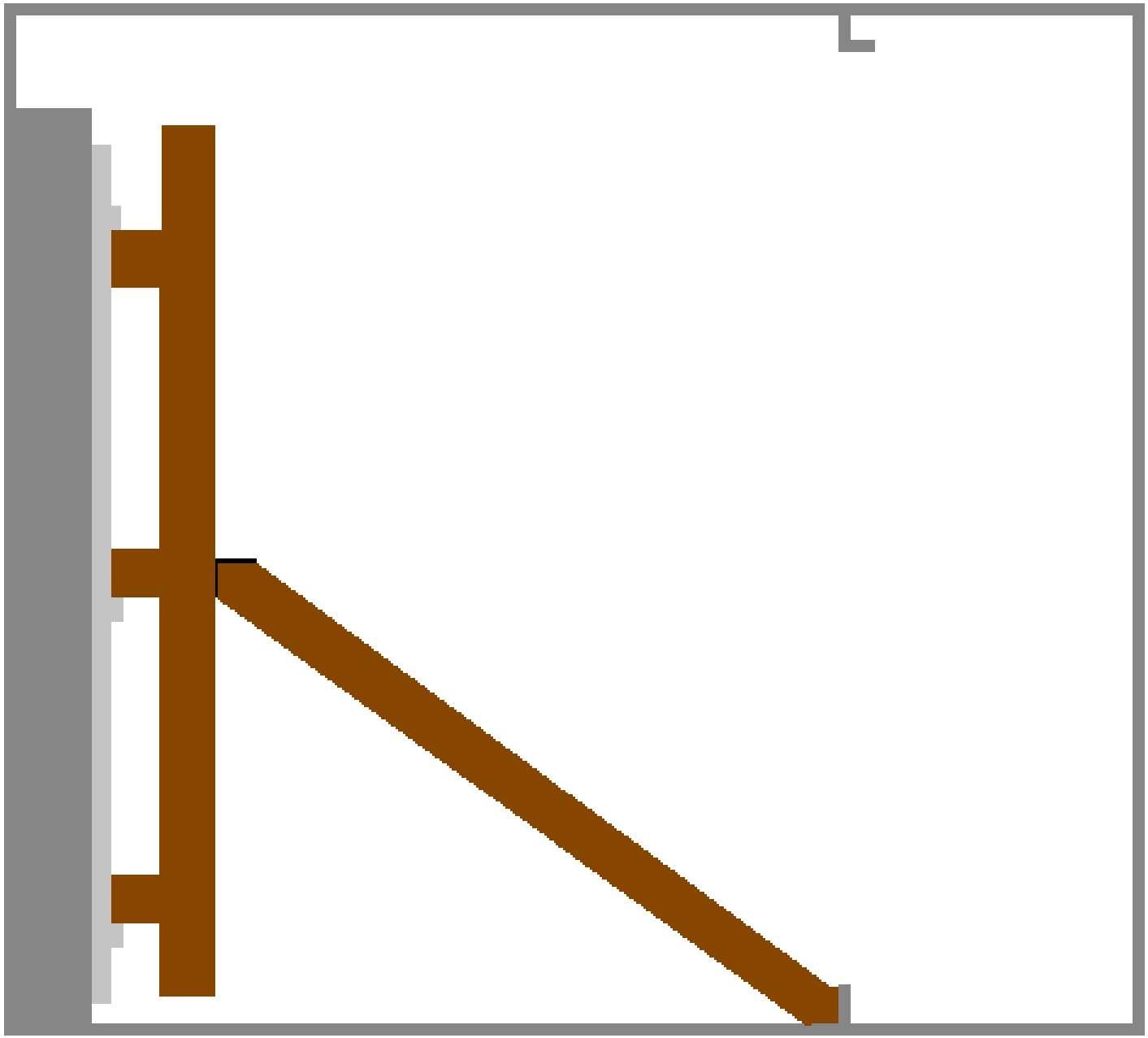
- Length of shore

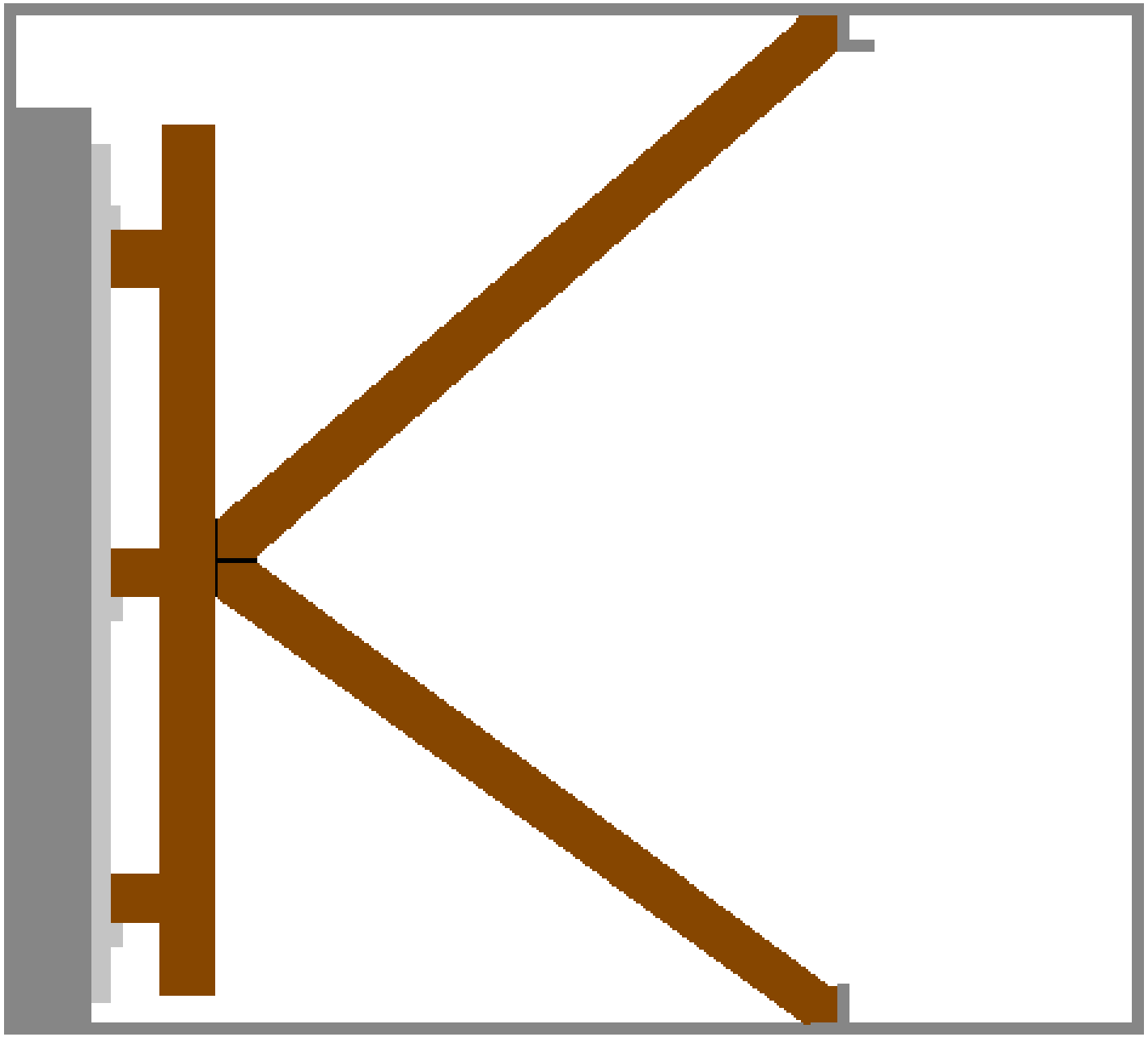


Transfer of measurements from the square to the shore

Once the overall length of the shore is determined, measure out the length and proceed to layout the second half of the shore.







Review and Summary

ENABLING OBJECTIVES

IDENTIFY the need for basic shoring structures and the materials used for their construction in accordance with NSTM 079 VOL 2, NWP 3-20.31, COMNAVSUFLANTINST 3541.1 and COMNAVSURPACINST 3541.4

IDENTIFY proper procedure, tools and equipment to construct shoring in accordance with NSTM 079 VOL 2, NWP 3-20.31, COMNAVSUFLANTINST 3541.1 and COMNAVSURPACINST 3541.4

ENABLING OBJECTIVES

LAYOUT and Construct I, H, and K Type Shoring structures given Shoring and a Shoring Kit in accordance with NSTM 079 VOL 2, NWP 3-20.31, COMNAVSUFLANTINST 3541.1 and COMNAVSURPACINST 3541.4

Review and Summary

What is shoring?

Process of placing supports against, beneath or above damaged areas

Review and Summary

When do you shore?

- Good judgement is the best guide
- Need indicated
- When in doubt, always shore

Review and Summary

What are the 3 Types of Shoring?

- Direct Compression
- Cross Axial
- Triangulation

Review and Summary

What is the working length of a shore?

30 times the minimum thickness of the shore